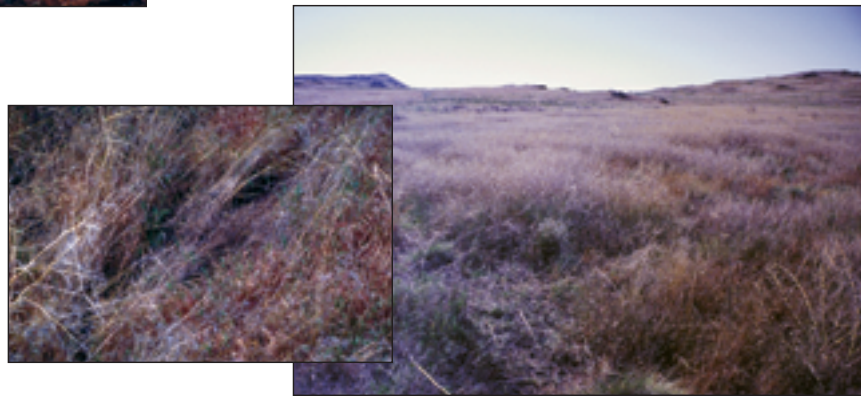


Figure 5.2 *Biological crust development in a successful seeding in the northern Great Basin (above) and lack of development in an exotic annual grass community (below). Note the difference in plant density and the accumulation of litter on the soil surface that limits biological crust development in the exotic community.*



5.2 Livestock Grazing

Managing for healthy biological soil crusts requires that grazing occur when crusts are less vulnerable to shear and compressional forces. Timing for this is highly dependent on soil type and climatic regimes (see Chapter 4). Crusts on all soil types are least vulnerable to disturbance when soils are frozen or snow covered. Biological crusts on sandy soils are less susceptible to disturbance when moist or wet; on clay soils, when crusts are dry (Fig. 2.5; Marble and Harper 1989; Memmott et al. 1998). In general, light to moderate stocking in early- to mid-wet season is recommended. On low- to mid-elevation sites, winter use is advantageous to most vascular plants, including riparian communities, and substantially reduces supplemental feed costs associated with livestock production. Winter grazing also most closely replicates the grazing strategy of native herbivores, who use more productive, higher-elevation sites during summer and lower-elevation sites in winter (Fig. 5.3; Miller et al. 1994; Burkhardt 1996). It is important to remove livestock well

NOTES

before wet season's end to allow regrowth of crustal organisms before extended drought. Use when soil surfaces are very wet and muddy should also be avoided to prevent burying the crust (Kaltenecker and Wicklow-Howard 1994; Kaltenecker et al. 1999b). Implementation of rest-rotation strategies that minimize frequency of surface disturbance during dry seasons and maximize periods between disturbances will reduce impacts to biological soil crusts.

Dispersal of livestock throughout useable portions of pastures should also be emphasized. Disturbance of sensitive sites should be avoided or minimized when they are a small proportion of the overall pasture or landscape. Ways to disperse livestock include the following:

- Locating water and salt (or other supplements) on sites with low potential for biological soil crust development and in areas that discourage livestock from loitering. In many areas, sites with high rock cover are good options. Livestock trailing preferences need to be considered when evaluating locations.
- Using brush barriers or fence segments to divert trailing. Sites with high potential for biological soil crust development are often not preferred by livestock for forage; however, these same sites may be open and easy to walk across. Because of lack of forage, minimal barriers are usually sufficient to discourage access.



Figure 5.3 *Native grazers in the western U.S., such as pronghorn antelope and muledeer, tend to use higher, more productive sites during summer and move to lower elevation sites for winter forage. They may also move through areas, rather than staying in one area. This type of seasonality and intensity minimizes impacts to biological crusts by concentrating use when crusts are frozen or moist.*